The requirement for all new-build homes to be built to a zero carbon standard by 2016 is beginning to look distinctly unrealistic. Not least because the government itself has not even managed to agree what zero carbon actually means. In this report we consider the wider picture by examining the policy background, implications for developers and the market, and even the future of energy distribution.

The shift to zero carbon has huge

implications for housing market

affordability, land market economics and

politics. In our Green Homes Survey,

featured on page 5, we point to a potential

22% uplift in build costs. With buyers

already struggling to afford homes, at their

current prices we examine what needs to

give to accommodate these increased costs.

Britain, now a net importer of energy, faces

a need to make substantial investment in

energy infrastructure. At the same time,

when budget cuts make this investment

appear all but impossible. Current estimates

suggest that decarbonising the national grid

and creating the kind of renewable energy

industry enjoyed in Europe in such a short

space of time is not going to be possible.

The coalition government's localism

agenda is set to hand greater powers to

communities. It will be interesting to see

which communities will agree to have

renewable energy plants located on their

doorstep in order to meet the government's

ambitions.

In addition to assessing the main challenges

and opportunities for the house-building

sector from zero carbon legislation, we

have also provided a series of practical

observations and recommendations for

what needs to happen if the UK has any hope

of complying with its commitments.

Why zero carbon?

In December 2006 the then Labour government proposed in 'Building a Greener Future' that all new homes would be constructed to a 'zero carbon' standard by 2016. Alongside this proposal, the government also issued the 'Code for Sustainable Homes' which provided a set of voluntary energy, carbon and sustainability standards for new homes. Aspirations for new zero carbon non-domestic buildings by 2019 were outlined in the 2008 Budget.

The new coalition government has brought with it a range of new policy objectives, but the pledge to ensure that all newly built homes are zero carbon by 2016 has been retained. Although this target has been well reported, the underlying detail, particularly concerning construction, renewable energy and required changes to the planning system, is both complex and confusing.

As far as the construction sector and environmental legislation are concerned, it is at a European, rather than at a national

level, where the real power lies. The EU's Energy Performance in Buildings Directive (EPBD) ultimately determines the UK Government's room for manoeuvre in this area.

The EPBD Recast – an updated version of the original directive – was published in June 2010 and it will be this document that the new coalition government will have to adhere to. The biggest revelation provided by a study of the EPBD is that there is not a single mention of the phrase 'zero carbon'.

The directive goes into detail about ‘zero

energy’ buildings but with one vital caveat:

the inclusion of the word ‘nearly’.

It says:

“Member States shall ensure that by 31

December 2020, all new buildings are nearly

zero energy buildings; and after 31 December

2018, new buildings occupied and owned by

public authorities are nearly zero energy

buildings. Member States shall draw up

national plans for increasing the number of

nearly zero energy buildings. These national

plans may include targets differentiated

according to the category of building."

There are three important points to note

here. Firstly, the definition of zero carbon

does not need to be nearly as prescriptive as

has been attempted by the previous Labour

government and the current coalition

government, secondly the deadline for

compliance is 2020, not 2016, and finally

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High ambitions meet reality

The requirement for all new-build homes to be built to a zero carbon standard by

2016 is beginning to look distinctly unrealistic. Not least because the government itself has not even managed to agree what zero carbon actually means. In this report we consider the wider picture by examining the policy background, implications for developers and the market, and even the future of energy distribution.

Liam Bailey

Head of Residential Research

The Knight Frank Green Homes Survey 2010

The charts featured in this report illustrate the results of the Knight Frank Green Homes Survey 2010. For full details please see page 7.

0

10

20

30

40

50

60

Reduced potential

development

volumes

No impact on

development

volumes

Increased

development

volumes

Figure 1

In terms of development volumes, has

the lack of a firm zero carbon definition

impacted on the housing industry’s

preparation for the 2016 deadline?

Source: Knight Frank Residential Research

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while the EU is setting out the targets, the

UK government will have full control over the

path we take to get there and the incentives

and measures we use to make it happen.

What happens next?

Building Regulations will be tightened this

month (October 2010) and then again in

three years' time, as part of a plan to spell

out properly what the boundaries for

delivering zero carbon homes are. Part L

of the Building Regulations currently does

this but obviously does not cater for the

newest targets.

We expect to see greater legislative

attention being paid to higher standards

of fabric efficiency. While the zero carbon

definition looks primarily at the energy uses

within a building, clearly the materials used

to construct a building play a huge role in

determining how energy efficient it will be.

Despite all the work which has gone into

developing the UK's Code for Sustainable

Homes, there is still a critical missing link

– namely a firm definition of "zero carbon".

Until a definition is confirmed, consulted upon and agreed, there will be considerable difficulty for the house-building industry to plan for the 2016 deadline.

The Multi-Utility Services Company solution

A Multi-Utility Services Company (MUSCo) is a special purpose vehicle that can be set up to provide energy, data and water services to a defined area. They essentially offer the provider a monopoly on supplying homes in the development area with certain services. For instance, long-term contracts can be based on the heat supply, but not for the electricity which has to be sold on the open market. It is hoped though that many homes within the district would continue to stick with the original supplier because of competitive pricing.

Essentially, a MUSCo can approach the supply of utilities in a much more efficient and low-carbon way than is currently the case. It is a commercial structure set up normally as a special purpose vehicle. What makes it more efficient is when the MUSCo is utilising a local energy generation facility.

However, for this to function, there needs to be a viable proportion of the potential customer base available to the MUSCo. The Olympic Park energy centre and network, which cost in the region of £90 million, has this kind of access to a customer base.

A concession agreement from the Olympic Delivery Authority and Olympic Park Legacy Company agreeing a 40-year deal for the provision of heat to all homes on the site is in place.

Utilities investors need certainty of investment, which may be a polite way of saying monopoly. EU law means you cannot give a monopoly concession on electricity, but it

does allow for heat to be contractually tied up and to act as the key to opening the door of guaranteed customer purchasing power. Other EU countries do not have restrictions like this, but there would be too many problems with trying to change the legislation at the EU level.

We already have semi-monopolies in the UK – distribution networks with regional powerhouses in place, for example EDF in London and the south east. We need to move towards regional energy strategies and to identify the new sources of demand over the next 20 years. We also need regional leadership in delivering these projects, along with flexibility in the planning system to facilitate and promote low carbon infrastructure.

Yes

No

19.8%

80.2%

Figure 2

Do you believe that the ambition for

mandatory zero carbon residential

development from 2016 is compatible with a

significant growth in development volumes?

Figure 3

The government has proposed that ‘allowable solutions’* may be accepted to help

future zero carbon compliance. Which of the following statements do you agree with?

***‘Allowable solutions’ will require a local and highly defined ‘offset’ payment to be made for dealing with remaining carbon**

emissions off-site.

Allowable solutions are easily understandable

and a useful solution

Allowable solutions are good in theory but will

require much more definition on how they

will be priced and what they will be spent on

Allowable solutions are a dangerous development

which could lead to the creation of a new s106

style “green development tax” that is both unfair to

developers and unclear who will administer it

2.6%

50.9%

46.6%

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Energy challenges

One of the main efforts being made by

the government to achieve zero carbon

development is to radically reduce carbon

emissions by the generation of renewable

energy within new developments. This

process of providing for low-carbon districts

or decentralised energy supplies will have

important implications in the UK.

The process of decarbonising the grid

will involve a huge shift from high carbon

power generation sources to low carbon

ones. At the same time we must see a

substantial shift towards energy generation

infrastructure that is much closer to the

point of use. We will effectively move away

from our post-war centralised grid system

built around relatively few very large

coal-fired power stations, with high

transmission losses and high carbon

technologies, to smaller scale, localised,

low carbon infrastructure.

However, without a national renewable

strategy, or any firm plans for how to

decarbonise the grid, Britain is years behind

Scandinavia and other parts of Europe. This

means that the infrastructure development

necessary to make zero carbon homes a

reality just does not currently exist on the

scale necessary.

So we are looking at a dual approach.

One where longer-term infrastructure

development focuses on large-scale

off-shore wind and nuclear energy that is

fed into the grid. These investments can

then work alongside decentralised energy

projects, such as solar, biomass, ground

and air source heat pumps, waste-to-energy

and other biofuels with a much shorter

lead-in time.

The scale of investment needed for

decentralised energy projects will be

significant, and it will not be met solely by

developers. Innovative financial models will

be required if the funding for off-site and

near-site zero carbon energy solutions is to

be secured.

The essential factors in the viability of local

or district energy infrastructure projects are

their scale and security of market.

Small-scale projects serving a few hundred

homes are too costly to be viable and lack

the critical mass to be effective, but finding

ways to integrate new low carbon energy

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Figure 4

What is your organisation doing to prepare for the shift from Code Level 4 to Code Level 6?

Source: Knight Frank Residential Research

0

20

40

60

80

100

Micro-hydro on-site

renewable energy

generation

Other biofuel on-site

renewable energy

generation

Waste to energy

on-site renewable

energy generation

Wind on-site

renewable energy

generation

District heating /

cooling systems

Biomass on-site

renewable energy

generation

Passivhaus standard

insulation levels and

thermal efficiency

Solar on-site

renewable energy

generation

Implemented

at trial scale

Planning to

implement

No plans at

the moment

Not

applicable

Implemented at

commercial scale

0

5

10

15

20

25

30

35

40

45

No

definitely

not

Yes Yes Unsure No

definitely

Figure 5

Do you think that local authority planners

and building control officers have the right

skills in place to help advise the industry in

the shift from Code Level 4 to Code Level 6?

What about existing

homes?

With current levels of new-build

construction at all-time lows, zero

carbon new-build homes will not have

a significant impact on our national

carbon-reduction targets. The

Department for Communities and

Local Government estimates that 87%

of all homes existing in 2010 will still

be with us in 2050. This means that

improving the efficiency of older homes

will have a much more significant impact

on carbon emissions than the additional

effort required in relation to new homes

to shift from Code Level 4 (a home

graded as achieving energy efficiency

44% above the standard requirements

in part L of the Building Regulations) to

Code Level 6 (a zero carbon home) as set

out in the Code for Sustainable Homes.

Finding a reasonable pay-back

mechanism to incentivise the

intervention in existing housing stock

will continue to be a significant issue.

Feed-in tariffs, which seek to incentivise

investment in micro-generation

products through subsidised tariffs

could help, but have been thrown into

uncertainty as a result of the recent

coalition government announcement

that they would be included in the

Comprehensive Spending Review.

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infrastructure into existing residential areas

could be an economically sensible way of

providing utilities for new developments

and connecting to older building stock.

It is important to remember that 80% of the

buildings that will exist in 20 years time

(and consuming energy) are already built.

Given that finance for decentralised

energy projects, particularly with capital

expenditure under £50 million, is still very

difficult to secure, and that land values are

unlikely to bounce back from current levels

rapidly, there is unlikely to be a significant

increase in lending from traditional sources.

A suggested zero

carbon hierarchy

The lack of firm guidance on the zero carbon

definition, does at least offer the potential

for an industry-wide debate on how the

government's ambitions are likely to be met.

Our view is that the cornerstone of future zero

carbon delivery will need to be based on a

hierarchy of actions, which deal with energy

efficiency first, before provision is made for

the reduced remaining energy need.

In our three-step hierarchy, described

below, steps one and two should account

for around 70% of the required saving in

energy use, with the final 30% coming from

step three.

1. Energy efficiency

The fabric of new homes should meet strict

levels of energy efficiency. To be responsive

to varying proportions of external wall,

‘passivhaus’ standards are proposed: 39

kWh/m²/yr for apartment blocks and mid

terrace houses and 46 kWh/m²/yr for

semi-detached, end-of-terrace and

detached houses.

2. On-site and directly connected

renewables

New developments will need to include on-site renewable energy generation, such as solar, biomass, waste-to-energy or other biofuel as well as heat from directly connected sources.

3. Allowable solutions

The remaining emissions reduction will need to be achieved through a range of 'allowable solutions' – a variety of measures that will vary dependent on the size and location of the development. There will be an agreed cap to their cost that will be related to the

comparative carbon cost in achieving the

same level of carbon reduction through

direct investment. It is this area in particular

where greater clarity is urgently needed.

How will allowable solutions be priced?

What carbon projects will be prioritised?

How will it be integrated into the planning

system? Who will administer these large

allowable solutions funds?

Future steps

A fundamental question is how local

planning authorities will be guided to

interpret the acceptable routes to meeting

zero carbon. Clearly, limiting a developer's

options to on-site solutions is not viable

for all sites. Therefore, we believe that a

clear system will have to be developed to

allow developers to use near-site and

off-site solutions.

Bureaucratic and prescriptive decrees over

technologies – through enforced rules

spearheaded by Merton Council in south

London – have undermined the wider

objectives of reducing emissions. The

so-called ‘Merton Rule’ earned notoriety by demanding that 10% (and now often 20%) of energy for new developments was produced through on-site renewable technology.

While pioneering at its time, the goal of pushing developers to put more and more renewables on-site is a blind alley. The most important priority must be to achieve the largest possible carbon reduction in the most cost-efficient manner. The best bang for the developer’s buck in carbon terms.

In our view, the hierarchy approach outlined

above should be followed so that developers know the costs involved at each stage and the routes open to them to achieve zero carbon development. For zero carbon homes to be a reality, the developer must be left to make the right decision for their project. This will include initially building to very high fabric efficiency standards (with an associated increase in construction costs). Based on their site boundary, location and loadings, developers will then need to decide what renewables provision is cost

effective on site. Finally, developers will

need to pay into an allowable-solutions

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Yes

No

29.0%

71.0%

Figure 7

Is there a sale value premium for Code

Level 6 homes now?

0

5

10

15

20

25

30

35

40

30%+

increased

cost

20%-30%

increased

cost

10%-20%

increased

cost

0%-10%

increased

cost

Lower

costs

Figure 6

What is the likely immediate impact

on build costs from the shift from Code

Level 4 to Code Level 6?

“For zero carbon homes

to be a reality, the

developer must be left to

make the right decision

for their project.”

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fund for specific carbon-abatement projects

at a reasonable price that will not make the

entire development unviable.

This approach will provide the developer

with the flexibility to meet the zero carbon

definition with certainty and economic sense.

Building to ‘passivhaus’ standards will cost

more, but this is a surmountable task with

improvements in construction efficiencies

and much greater pre-fabrication. On-site

renewable feasibility assessments are now

commonplace and will not require greater

cost or complexity than is currently the

case. However, the viability of renewables

investments on-site will be drastically

undermined if feed-in tariffs are diluted

or scrapped.

The area of greatest uncertainty is allowable

solutions. There are several key questions

that will need to be clarified before this

option can be rolled out:

• What price per tonne of carbon abated will

be used?

• Will this rise and fall with the traded price

of carbon or with the cost per tonne of

carbon abatement projects, using a basket

of technology options?

• Who will administer the payments to the

fund?

• Who will administer the expenditure of

allowable solutions capital on carbon

abatement projects?

• What projects will be prioritised?

• Who will audit this process?

The ideal outcome for the industry, which

we believe will lead to early industry

preparation, would be to set minimum

fabric efficiency standards based on work by

organisations like the Zero Carbon Hub, and

utilise a flexible approach to meeting zero

carbon targets based on the carbon saving

achieved through the most efficient method.

This flexibility should allow for different

solutions to be chosen for different sites

and a range of technologies to be employed.

The common denominator in all of these

cases must be the price per tonne of carbon

abated. This will be the factor that a

developer will use when examining whether

on-site, near-site (connected), off-site or

allowable solutions works best for them

and their project.

Setting this price, just as determining the

zero carbon definition to be used, requires

government leadership. Given the delays

we have seen to date, we can only hope that

greater clarity and speed of determination

are shown soon.

The hope has to be that we can create a

market-driven model as a mechanism for

meeting our zero carbon targets. With this

model in place we would expect that

competition and innovation will follow,

driving down costs and raising efficiencies.